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(54) **ABSORBENT HYGIENIC ARTICLE HAVING FLAPS AND OF DIFFERENTIAL EXTENSIBILITY**  
ABSORPTIONSFÄHIGES HYGIENEERZEUGNIS MIT LASCHEN UND MIT UNTERSCHIEDLICH  
DEHNBAREN BEREICHEN  
ARTICLE HYGIENIQUE ABSORBANT COMPORTANT DES RABATS ET PRESENTANT UNE  
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**EP-A- 0 405 403** **EP-A- 0 426 235**  
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## Description

### FIELD OF THE INVENTION

[0001] The present invention relates to absorbent articles such as female sanitary napkins, adult incontinence devices, and the like. Still more particularly, the present invention concerns absorbent articles having flaps and zones of differential extensibility for relieving the stresses that develop in the flaps when the flaps are folded down and under a wearer's undergarment.

[0002] The zones of differential extensibility are made of pre-corrugated or ring rolled portions.

### BACKGROUND OF THE INVENTION

[0003] All manner and variety of absorbent articles configured for the absorption of body fluids such as menses, urine, and feces are, of course, well known. Absorbent articles, particularly sanitary napkins, having wings or flaps are disclosed in the literature and are available in the marketplace.

[0004] Generally, the flaps extend laterally from a central absorbent means and are intended to be folded around the edges of the wearer's panties in the crotch region. Thus, the flaps are disposed between the edges of the wearer's panties in the crotch region and the wearer's thighs. Commonly, the flaps are provided with an attachment means for affixing the flaps to the underside of the wearer's panties.

[0005] The flaps serve at least two purposes. First, the flaps prevent exudates which otherwise would soil the edges of the wearer's panties from doing such. Second, the flaps help stabilize the napkin from shifting out of place, especially when the flaps are affixed to the underside of the panties.

[0006] Sanitary napkins having flaps of the various types are disclosed in U.S. Patent 4,687,478, entitled "Shaped Sanitary Napkin With Flaps", which issued to Van Tilburg on August 18, 1987, U.S. Patent 4,608,047, entitled "Sanitary Napkin Attachment Means", which issued to Mattingly on August 26, 1986, U.S. Patent 4,589,876, entitled "Sanitary Napkin", which issued to Van Tilburg on May 20, 1986, U.S. Patent 4,285,343, entitled "Sanitary Napkin", which issued to McNair on August 25, 1981, U.S. Patent 3,397,697, entitled "Disposable Sanitary Shield For Undergarments", which issued to Rickard on August 20, 1968, and U.S. Patent 2,787,271, entitled "Sanitary Napkin", which issued to Clark on April 2, 1957.

[0007] While sanitary napkins having flaps are commonly viewed as providing better protection against soiling as compared to sanitary napkins without flaps, the flapped napkins commonly experience problems that keep them from being optimally effective. These problems generally result from the stresses exerted on such flaps when the sanitary napkins are worn.

[0008] When the flaps are folded down along the edges

es of the wearer's panties, stresses are created in the flaps. The stresses are especially high along the fold line at the edges of the wearer's panties where the flaps are bent from the bodyside of the panty to the underside of the panty. These stresses are caused by fitting a flap around the curved outline of a panty crotch. These stresses are magnified when a wearer sits or crouches because the edges of the panties are pulled outward against the flaps thus increasing the forces against this fold line. When the stresses become too high, the flaps may become detached from the panty and some portion of the aforementioned benefits of the flaps may be lost. In addition, even if the stresses are not sufficient to detach the flaps, they may still be sufficient to cause the flaps to bunch longitudinally inward. This effectively reduces the size of the flaps and the area of the wearer's undergarments that the flaps are able to cover. Thus, there is a commercial need for a way of eliminating or at least reducing the stresses that develop in the flaps when folded, so as to prevent them from becoming detached from the wearer's panties and losing ability to cover a given area of the panties.

[0009] A number of variations on the types of flaps described above have been presented in an attempt to solve various problems. U.S. Patent 4,900,320 issued to McCoy on February 13, 1990, discloses a sanitary napkin having flaps affixed at points inward from the longitudinal edge of the napkin. U.S. Patent 4,911,701 issued to Mavinkurve on March 27, 1990, discloses a sanitary napkin having elastic means for providing greater convex shape to the body-facing portion of the central absorbent and for enabling adhesive-free placement of the flaps of the napkin. U.S. Patent 4,940,462 issued to Salerno on July 10, 1990, discloses a sanitary napkin with longitudinally expandable flaps. A sanitary napkin having flaps with stress relief means in the form of a notch or a slit is described in U.S. Patent 4,917,697 which issued to Osborn, III, et al. on April 17, 1990. Although this latter sanitary napkin works quite well, the search for sanitary napkins having improved flaps has continued.

[0010] The stresses described above can also unduly limit the size of the flaps used with an absorbent article since the stresses are typically greater in products having large flaps (that is flaps having a relatively large longitudinal dimension). There is, thus, also a need for an improved stress relief means for relieving the stresses that develop in the flaps, that does not limit the size of the flaps that can be used.

[0011] Therefore, it is an object of the present invention to provide an absorbent article, such as a sanitary napkin, having flaps and zones of differential extensibility for relieving the stresses that develop in the flaps when they are folded down along the edges of the crotch of the wearer's undergarments and affixed to the underside of the undergarments.

[0012] It is an additional object of the present invention to provide an absorbent article having flaps and

zones of differential extensibility that allow larger flaps to be used on the absorbent article, than those of prior products.

[0013] These and other objects of the present invention will be more readily apparent when considered in reference to the following description and when taken in conjunction with the accompanying drawings.

#### SUMMARY OF THE INVENTION

[0014] In accordance with the present invention, an absorbent article, such as a sanitary napkin, having flaps and zones of differential extensibility for relieving the stresses that develop in the flaps when the flaps are folded down along the edges of the wearer's panties in the crotch, is provided in accordance with the appended claims.

[0015] The sanitary napkin has a principal longitudinal centerline and a principal transverse centerline. The sanitary napkin comprises a main body portion and a pair of flaps associated with the main body portion. The main body portion of the sanitary napkin comprises a liquid pervious topsheet, a liquid impervious backsheet joined to the topsheet, an absorbent core positioned between the topsheet and the backsheet. The main body portion has two spaced apart longitudinal edges and two spaced apart transverse edges.

[0016] The flaps extend laterally outward from the main body portion. The flaps are associated with the main body portion at a juncture along the longitudinal edges of the main body portion. The flaps are divided into a front half and a back half by a flap transverse centerline. The absorbent article has two corner regions located adjacent the area of the ends of the junctures. One corner region is located adjacent the area of the juncture in each direction remote from the principal transverse centerline. The sanitary napkin comprises zones of differential extensibility which allow the corner regions to extend transversely outward to a greater degree than the portions of the sanitary napkin located along the flap transverse centerline. The zones of differential extensibility provide a means for the relief of stresses in the flaps of the sanitary napkin when the sanitary napkin is placed in the wearer's undergarments. The zones of differential extensibility are made of pre-corrugated or ring-rolled portions of the absorbent article.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Figure 1 is a top plan view of a sanitary napkin which is not an embodiment of the present invention

[0018] Figure 2 is a top plan view of a sanitary napkin embodiment of the present invention having flaps with a preferred type of zones of differential extensibility.

[0019] Figure 2A is a lateral cross-sectional view taken along line 2A-2A of Figure 2 through one of the flaps of the sanitary napkin.

[0020] Figure 3 is a perspective view of the crotch por-

tion of a women's panties.

[0021] Figure 4 is an exploded perspective view showing the assembly of a sanitary napkin which contains a preferred absorbent core and panty fastening adhesive pattern for use in the present invention (but which does not include flaps and the zones of differential extensibility of the present invention).

[0022] Figure 5 is a top plan view of a sanitary napkin having flaps provided with an optional barrier feature.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] The present invention relates to absorbent articles, such as female sanitary napkins. More particularly, the present invention relates to absorbent articles having flaps and zones of differential extensibility for relieving the stresses that develop in the flaps when they are folded down along the edges of the crotch of the wearer's undergarments and attached to the underside of the undergarments.

[0024] The term "absorbent article", as used herein, refers to articles which absorb and contain body exudates. More specifically, the term refers to articles which are placed against or in proximity to the body of the wearer to absorb and contain the various exudates discharged from the body. The term "absorbent article" is intended to include sanitary napkins, pantliners, and incontinent pads (and other articles worn in the crotch region of a garment). The term "disposable" refers to articles which are intended to be discarded after a single use and preferably recycled, composted, or otherwise disposed of in an environmentally compatible manner. (That is, they are not intended to be laundered or otherwise restored or reused as an absorbent article.) In the preferred-embodiment illustrated, the absorbent article is a sanitary napkin designated 20.

[0025] The term "sanitary napkin", as used herein, refers to an article which is worn by females adjacent to the pudendal region that is intended to absorb and contain the various exudates which are discharged from the body (e.g., blood, menses, and urine). The present invention, however, is not limited to the particular types or configurations of absorbent articles shown in the drawings.

[0026] A sanitary napkin 20 which is not according to the present invention is shown in Figure 1. This embodiment has been excluded from the present invention during examination but remains in the specification to allow explanation of the main elements of a sanitary napkin. As shown in Figure 1, the sanitary napkin 20 basically comprises an absorbent means represented by central absorbent pad (or "main body portion") 22, and two flaps 24. (In the discussion that follows, unless otherwise noted, the sanitary napkin described herein will have two flaps. While it is not necessary that the napkin have two flaps, two flaps are preferred over one flap. Also, while it is not necessary that the flaps be mirror images of one

another, they preferably are. Thus, the description of one flap will be a description of the other, and, for clarity, discussion of the second flap may be omitted.)

**[0027]** The sanitary napkin 20 has two centerlines, a principal longitudinal centerline 1 and a principal transverse centerline t. The term "longitudinal", as used herein, refers to a line, axis or direction in the plane of the sanitary napkin 20 that is generally aligned with (e.g., approximately parallel to) a vertical plane which bisects a standing wearer into left and right body halves when the sanitary napkin 20 is worn. The terms "transverse" or "lateral" used herein, are interchangeable, and refer to a line, axis or direction which lies within the plane of the sanitary napkin 20 that is generally perpendicular to the longitudinal direction.

**[0028]** The sanitary napkin 20 is comprised of a topsheet 40, a backsheet 42, an absorbent core 44, and a pair of flaps 24. At least a part of the topsheet 40, backsheet 42, and absorbent core 44 comprise the main body portion 22. The flaps 24 shown in Figure 1 are comprised of separate pieces of material which are attached to the main body portion 22. (In alternative embodiments, such as those shown in U.S. Patent 4,917,697 issued to Osborn, the flaps 24 may be integral with the main body portion 22. In such a case, the topsheet 40 may form one surface of both the flaps 24 and the main body portion 22, and the backsheet 42 may form the other surface of the same. In addition, the absorbent material of the sanitary napkin 20 may extend into the flaps 24 to form a flap absorbent core, as described in greater detail in U.S. Patent 4,917,697.)

**[0029]** The flaps 24 are each associated with main body portion 22 along a juncture. This is typically a longitudinally-oriented (or "longitudinal") juncture, such as lines of juncture 30. As used herein, the terms "juncture" (or "line of juncture") refer to regions where the flaps 24 extend from or are joined to the main body portion 22. These regions can be any of various curved or straight lines, but they are not limited to lines. Thus, these regions can comprise flanges, strips, intermittent lines, and the like. In the embodiment illustrated in Figure 1, line of juncture 30 is a relatively straight line.

**[0030]** The flaps 24 have a proximal edge 32 adjacent the line of juncture. A distal edge (or "free end") 34 is remote from the line of juncture 30. As shown in Figure 1, each flap 24 is divided into a front half 26, and a back half 28 by a flap transverse centerline t<sub>1</sub>. The flap transverse centerline t<sub>1</sub> may coincide with the principal transverse centerline t of the sanitary napkin, but this is not absolutely required. The flap transverse centerline t<sub>1</sub> extends through the principal longitudinal centerline 1 to divide the sanitary napkin into four quarters A, B, C, and D.

**[0031]** The quarters comprise a first portion or zone (such as A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub>, and D<sub>1</sub>) adjacent at least a portion of the principal longitudinal centerline 1 and the flap transverse centerline t<sub>1</sub>. A second portion or zone (A<sub>2</sub>, B<sub>2</sub>, C<sub>2</sub>, and D<sub>2</sub>) is outboard of and complementary with

the first portion. (The terms "outboard" or "outward", as used herein, mean generally spaced in a direction away from these centerlines. The term "complementary", as used herein, means that the first and second portions form an entire quarter.)

**[0032]** The sanitary napkin 20 has at least one zone of differential extensibility (or "zone of extensibility", or simply "zone") 50. Preferably, as shown in Figure 2, the sanitary napkin 20 has four zones of differential extensibility 50, one in each quarter of the sanitary napkin 20. The zones of differential extensibility 50 relieve the stresses which develop in the flaps 24 when they are folded around a panty crotch. Since the zones of differential extensibility 50 relieve stresses in the flaps, they may be referred to herein as a type of "stress relief means".

**[0033]** The term "zone of differential extensibility", as used herein, refers to a portion of the sanitary napkin 20 which is capable of extending a differing amount (preferably a greater amount), than surrounding portions of the sanitary napkin 20. These "surrounding portions" of the sanitary napkin comprise the first portions of the quarters. The zones of differential extensibility 50, thus, comprise the second portions of each quarter.

**[0034]** The zones of differential extensibility 50 are preferably primarily extensible in a greater amount generally outward in the transverse direction. This is generally in the direction of the arrows shown in Figure 2. As used herein, "generally in the transverse direction" means that the extensibility has a transverse component. All of the extension, however, need not be exactly parallel to the principal transverse centerline of the sanitary napkin. The extensibility is preferably oriented more in the transverse direction than in the longitudinal direction.

**[0035]** The differential extensibility referred to herein, however, must be elasticless. That is, it must be accomplished without the use of separate elastic pieces, strands, or materials to contract one or more portions of the sanitary napkin. The zones of differential extensibility must also be accomplished without slitting or notching portions of the sanitary napkin that cover the wearer's undergarments. This will have the advantage that exudates will not be able to travel through the slits or notches to soil the wearer's undergarments.

**[0036]** Suitable structures for the zones of differential extensibility 50 are zones of material that are corrugated or "ring rolled". These structures (although sometimes shown only as being part of the flaps 24), can comprise portions of the main body portion 22, portions of the flaps 24, or both. They can be integral parts of these components of the sanitary napkin, or separate elements, such as pieces of material, joined to the sanitary napkin.

**[0037]** The zones of differential extensibility 50 are more specifically located in the corner regions 52 of the sanitary napkin 20. (Thus, the second portions A<sub>2</sub>, B<sub>2</sub>, C<sub>2</sub>, and D<sub>2</sub> of the quarters preferably comprise the cor-

ner regions 52 of the sanitary napkin 20.) The sanitary napkin 20 preferably has four corner regions 52 (two by each flap, and one in each quarter).

[0038] The term "corner regions" 52, as used herein, refers to portions of the sanitary napkin 20 that are generally located along or adjacent a portion of the longitudinal juncture of each flap 24. The corner regions 52 for each flap 24 are located in two areas in the regions of the ends 30a and 30b of each juncture 30. One corner region 52 is located adjacent the longitudinal juncture 30 in the front half 26 of the flap 24. The other is adjacent the longitudinal juncture 30 in the back half 28 of the flap 24. The corner regions 52 are preferably at least partially disposed longitudinally away from the flap transverse centerline  $t_1$  in each direction. (Thus, the corner regions 52 may be described as being longitudinally "remote" from the flap transverse centerline  $t_1$ .)

[0039] In the most preferred case (as will be subsequently described in greater detail), the zones of differential extensibility 50 are located along a portion of the fold line where the flaps 24 are folded around the wearer's panty crotch. The fold line will typically be located along or adjacent the longitudinal juncture 30 of each flap 24. Since the terms "portions", "zones", and "regions", as used herein, refer to general areas, the zones of differential extensibility 50 and the corner regions 52 are, thus, not limited to points which lie precisely on the lines of juncture 30. Typically, they will include both those points which lie on the lines of juncture 30 as well as the surrounding areas of the sanitary napkin 20 (which include the aforementioned fold lines). The longitudinal junctures, thus, typically serve as good approximations for the location of the zones of differential extensibility 50.

[0040] The corner regions 52 are designated as such because they typically include the "corners" formed along the periphery 23 of the sanitary napkin 20. The "corners" occur where the edges 35 of the flaps 24 intersect with the longitudinal side edges 22a of the main body portion 22 when the sanitary napkin 20 is shown in a plan view. It is not necessary for there to be a sharp angle formed at the intersection of these edges, or for lines of demarcation to designate the same, however. (Another way to describe the corner regions 52 is with reference to U.S. Patent 4,917,697 issued to Osborn, III, et al. The corner regions 52 described herein are typically comprised at least of those areas shown as having slits or notches in the Osborn, et al. patent. (For simplicity, these areas may be referred to herein as "notch regions"). However, the corner regions 52 in the present invention preferably encompass a larger area than the slits or notches shown in the Osborn patent.)

[0041] The portions of the flaps 24 in the corner regions 52 of the sanitary napkin 20 may be referred to as the "corner regions of the flaps" or "flap corner regions". These may be separately designated 52' although they are still considered to comprise the corner regions 52, per se.

[0042] The individual components of the sanitary napkin 20 will first be looked at in greater detail.

[0043] The topsheet 40 is liquid permeable and when the sanitary napkin 20 is in use, the topsheet 40 is in close proximity to the skin of the user. The topsheet 40 is compliant, soft feeling, and non-irritating to the user's skin. It can be made from any of the materials conventional for this type of use. Nonlimiting examples of suitable materials that can be used as topsheet 40 are woven and nonwoven polyester, polypropylene, nylon, and rayon and formed thermoplastic films, with formed films being preferred.

[0044] Suitable formed films are described in U.S. Patent 3,929,135, entitled "Absorptive Structure Having Tapered Capillaries", which issued to Thompson on December 30, 1975, U.S. Patent 4,324,426, entitled "Disposable Absorbent Article Having A Stain-Resistant Topsheet", which issued to Mullane and Smith on April 13, 1982, U.S. Patent 4,342,314, entitled "Resilient Plastic Web Exhibiting Fiber-Like Properties", which issued to Radel and Thompson on August 3, 1982, and U.S. Patent 4,463,045, entitled "Macroscopically Expanded Three-Dimensional Plastic Web Exhibiting Non-Glossy Visible Surface and Cloth-Like Tactile Impression", which issued to Ahr, Louis, Mullane, and Ouellette on July 31, 1984. Formed films are preferred for topsheet 40 because they are pervious to liquids and yet non-absorbent. Thus, the surface of the formed film which is in contact with the body remains dry and is more comfortable to the wearer.

[0045] In one particularly preferred embodiment (shown in Figure 4 without the zones of differential extensibility of the present invention) the sanitary napkin 20 is comprised of components that are extensible (i.e., capable of stretching, particularly in the longitudinal direction) when the sanitary napkin is worn. Preferably, the sanitary napkin 20 is capable of elongating between about 15% and about 40% of its unstretched length. This extensibility provides better in-use fit, comfort, and decreased staining. In other embodiments, only limited portions of the components of the sanitary napkin 20 are capable of stretching.

[0046] A particularly preferred topsheet 40 for use in such an embodiment is one which is made in accordance with U.S. Patent 4,463,045 and ring rolled to provide it with a degree of longitudinal extensibility. Suitable processes for ring rolling or "pre-corrugating" are described in U.S. Patent 4,107,364 issued to Sisson on August 15, 1978, U.S. Patent 4,834,741 issued to Sabee on May 30, 1989 and in co-pending, commonly assigned U.S. Patent Application Serial No. 07/662,536 entitled "Improved Method And Apparatus For Incrementally Stretching A Zero Strain Stretch Laminate Web To Impart Elasticity Thereto" filed by Gerald M. Weber et al. on February 28, 1991, U.S. Patent Application Serial No. 07/662,537 entitled "Improved Method and Apparatus For Incrementally Stretching Zero Strain Stretch Laminate Web In A Non-Uniform Manner To Impart A

Varying Degree of Elasticity Thereto" filed by Kenneth B. Buell et al. on February 28, 1991, and U.S. Patent Application Serial No. 07/662,543 entitled "Improved Method And Apparatus For Sequentially Stretching Zero Strain Stretch Laminate Web To Impart Elasticity Thereto Without Rupturing The Web" filed by Gerald M. Weber et al. on February 28, 1991. The fold lines in the corrugations of the topsheet should run in the transverse direction so the topsheet is longitudinally extensible.

[0047] Such a topsheet is described in greater detail in the following patent applications which were filed on June 23, 1991: U.S. Patent Application Serial No. 07/734,404 entitled "Absorbent Articles, Especially Catamenials, Having Improved Fluid Directionality, Comfort and Fit" filed in the names of Thompson, et al.; U.S. Patent Application Serial No. 07/734,392 entitled "Fluid Handling Structure for Use in Absorbent Articles" filed in the names of Thompson, et al.; and, U.S. Patent Application Serial No. 07/734,405 entitled "Absorbent Core for Use in Catamenial Products" filed in the names of Buenger, et al. These patent applications may be referred to collectively as the "Capillary Channel Fiber" patent applications.

[0048] In addition, in preferred embodiments of the present invention, at least a portion of the outer surface 40a of the topsheet 40 is treated with a surfactant. It is preferred that the surfactant be substantially evenly and completely distributed across at least the portion of the outer surface 40a of topsheet 40 that overlays the main body portion 22. This can be accomplished by any of the common techniques well known to those skilled in the art. For example, the surfactant can be applied to topsheet 40 by spraying, by padding, or by the use of transfer rolls.

[0049] Treating the outer surface 40a of the topsheet 40 with a surfactant renders the surface of the topsheet 40 more hydrophilic. This results in liquid penetrating the topsheet 40 faster than it would if the surface were not treated. This diminishes the likelihood that menstrual fluids will flow off topsheet 40 rather than being absorbed by the absorbent core 44. Preferably, any portions of the topsheet 40 that overlay the flaps 24 are not treated with the surfactant. This will minimize any tendencies fluids may have to spread laterally across the flaps and to come in contact with the wearer's thighs and other parts of the wearer's body.

[0050] In preferred embodiments, the inner surface 40b of topsheet 40 is secured in contacting relation with the absorbent core 44. This contacting relationship results in liquid penetrating topsheet 40 faster than if the topsheet 40 were not in contact with absorbent core 44. The topsheet 40 can be maintained in contact with absorbent core 44 by applying adhesive to the inner surface 40b of the topsheet 40. Suitable adhesives useful for this purpose are described in U.S. Patent 4,917,697. The adhesives can be applied by the same methods as the surfactant is applied to the outer surface 40a of the topsheet 40.

[0051] The absorbent core 44 is positioned between the topsheet 40 and the backsheet 42. The absorbent core 44 provides the means for absorbing menstrual fluid. The absorbent core 44 need not have an absorbent capacity much greater than the total amount of menstrual fluid anticipated to be absorbed. The absorbent core 44 is generally compressible, conformable, and non-irritating to the user's skin. It can comprise any material used in the art for such purpose. Examples include comminuted wood pulp which is generally referred to as air-felt, creped cellulose wadding, absorbent foams, absorbent sponges, synthetic staple fibers, polymeric fibers, hydrogel-forming polymer gelling agents, peat moss, or any equivalent material or combinations of materials.

[0052] Polymeric gelling agents are those materials which, upon contact with fluids (i.e., liquids) such as water or body fluids, imbibe such fluids and thereby form hydrogels. In this manner, fluids discharged into the absorbent core 44 can be acquired and held by the polymeric gelling agent, thereby providing the articles herein with enhanced absorbent capacity and/or improved fluid retention performance.

[0053] The polymeric gelling agent which is employed in the absorbent core 44 will generally comprise particles of a substantially water-insoluble, slightly cross-linked, partially neutralized, hydrogel-forming polymer material. The term "particles", as used herein, can refer to particles in any form, such as in the form of pellets, flakes, or fibers. The characteristics of the absorbent core 44 (including, but not limited to the preferred types of polymer materials used therein, and types of methods which can be used for preparing these polymer particles) are described in greater detail in U.S. Patent 5,009,653 issued to Osborn and the patents incorporated by reference in that patent, the disclosures of which are all incorporated by reference herein.

[0054] In one preferred embodiment, the absorbent core 44 is a laminate comprised of a layer of superabsorbent polymer material, such as in the form of particles, disposed between two air-laid tissues, first and second tissue layers (or "upper" and "lower" tissue layers). The first and second tissue layers provide containment of the superabsorbent polymer material, improve lateral wicking of the absorbed exudates throughout the absorbent core 44 and provide a degree of absorbency.

[0055] A suitable laminate is the superabsorbent laminate WATER-LOCK L-535 available from the Grain Processing Corporation of Muscatine, Iowa (WATER-LOCK registered TM by Grain Processing Corporation). Such superabsorbent laminates are disclosed in U.S. Patent 4,467,012, entitled "Composition For Absorbent Film And Method Of Preparation", which issued to Pedersen et al. on August 21, 1984, and U.S. Patent 4,260,443, entitled "Laminated Absorbent Process", which issued to Lindsay et al. on April 7, 1981.

[0056] In a particularly preferred embodiment, the absorbent core 44 is a laminate as described above which

is slitted or partially slitted for longitudinal extensibility as shown in FIG. 14 in the accompanying drawing figures. This slitted or partially slitted core is described in greater detail in the Capillary Channel Fiber patent applications.

[0057] The backsheet 42 is impervious to liquids and, thus, prevents menstrual fluid from soiling the clothing of the user. Any material used in the art for such purpose can be utilized herein. Suitable materials include embossed or nonembossed polyethylene films and laminated tissue. A suitable polyethylene film is manufactured by Monsanto Chemical Corporation and marketed in the trade as Film No. 8020.

[0058] In one alternative embodiment of the sanitary napkin 20 (typically in which the topsheet 40 overlays only the main body portion 22 and does not extend out to form the top surface of the flaps), the backsheet 42 may be comprised of two layers. In such a case, the backsheet 42 may comprise a first layer of lofted material disposed on the core-facing side 42a of the backsheet. The purpose of the first layer is to provide a comfortable, non-irritating surface against the body of the wearer. The lofted layer may be comprised of any suitable material, such as a nonwoven material. Preferably, the lofted layer comprises a hydrophobic nonwoven material. The second layer may be disposed on the garment side 42b of the backsheet 42, and may comprise a fluid impervious film. A low density polyethylene material about 0.01 to about 0.05 millimeters in thickness, preferably about 0.02 millimeters in thickness, has been found to work well as this second layer. A polyethylene film, such as is sold by the Ethyl Corporation, Visqueen Division, under model XP-39385 has been found particularly well suited for this second layer. The backsheet 42 may also be made of a soft, cloth-like material which is hydrophobic relative to the topsheet 40. A polyester or polyolefinic fiber backsheet 42 has been found to work well. A particularly preferred soft, cloth-like backsheet 42 material is a laminate of a polyester nonwoven material and a film such as described in U.S. Patent 4,476,180 issued to Wnuk on October 9, 1984.

[0059] A particularly preferred extensible backsheet 42 is an extended adhesive film Formula #198-338 manufactured by the Findley Adhesives Company of Wauwatosa, Wisconsin which is described in greater detail in the Capillary Channel Fiber patent applications.

[0060] As shown in Figure 1, the topsheet 40 is secured to backsheet 42 along a first seam, such as seam 36. The seam 36 can be formed by any means commonly used in the art for this purpose such as by gluing, crimping, or heat-sealing. The seam 36 is illustrated in Figure 1 as extending completely around the periphery of the main body portion 22. This is a preferred embodiment for ease of construction. (Other means of uniting the various elements can be used.)

[0061] The main body portion 22 is the portion of the sanitary napkin 20 that contains an absorbent means, such as absorbent core 44. The main body portion 22

has a liquid pervious body contacting surface (40) and an opposed liquid impervious surface (42). It is to be understood that the embodiment illustrated is only one possible embodiment, albeit a preferred one. Other possible embodiments include one in which an absorbent core 44 is essentially completely wrapped with topsheet before it is placed on a backsheet. The main body portion 22 can also comprise an absorbent core which possesses sufficient integrity to stand alone and is liquid pervious on one surface while the other surface has been treated to render it liquid impervious.

[0062] The main body portion 22 may be relatively thick or relatively narrow and thin. A narrow main body portion 22 may be effective because the overall configuration and use of sanitary napkin 20 results in main body portion 22 being maintained in close proximity to the body. Such proximity of main body portion 22 places it precisely where it should be: very near the body at the vaginal opening. The main body portion 22 can then absorb the vast majority of the menstrual fluid (menses) before it has an opportunity to flow along the sides of the main body portion 22. A thin main body portion may also be desired because it is typically comfortable to the user.

[0063] Figure 1 also show the fasteners, such as adhesive attachment means, central pad adhesive 54 and flap adhesive 56, which are adapted to secure the sanitary napkin 20 to the crotch region of an undergarment.

[0064] The central pad adhesive 54 provides an adhesive attachment means for securing main body portion 22 in the crotch portion of a panty. The outer surface of flap 24, adjacent the distal edge 34 of the flap, is preferably coated with a flap adhesive 56. The flap adhesive 56 is used to assist in maintaining the flap 24 in position after it is wrapped around the edge of the crotch portion of the panty as described below. The flaps 24 can be maintained in position by attaching the flaps 24 to the undergarment, or to the opposing flap. Suitable adhesive fasteners are described in greater detail in U.S. Patent 4,917,697.

[0065] The fasteners used with the present invention are not limited to adhesive attachment means. Any type of fastener used in the art can be used for such purpose. For example, the sanitary napkin 20 could be secured to the wearer's undergarment by the fastener described in U.S. Patent 4,946,527 entitled "Pressure-Sensitive Adhesive Fastener and Method of Making the Same" issued to Battrell on August 7, 1990. For simplicity, however, the fasteners will be described in terms of adhesive attachment means.

[0066] The adhesive attachment means are respectively covered by removable release liners, central pad release liner and flap release liner, both designated 58. The pressure-sensitive adhesives should be covered with release liners 58 to keep the adhesives from sticking to extraneous surfaces prior to use. Suitable release liners are described in U.S. Patent 4,917,697.

[0067] While a preferred sanitary napkin embodiment

of the present invention has been described, numerous other sanitary napkin embodiments having flaps are available and are disclosed in the literature. These could be provided with the zones of differential extensibility of the present invention. In particular, sanitary napkins having flaps are disclosed in U.S. Patent Application Serial No. 07/707,233 entitled "Sanitary Napkin Having Laterally Extensible Means for Attachment to the Undergarment of the Wearer", filed May 21, 1991 in the name of Osborn, et al., U.S. Patents 5,009,653 and 4,950,264, both entitled "Thin, Flexible Sanitary Napkin" which issued to Osborn on April 23, 1991 and August 21, 1990, respectively, U.S. Patent 4,940,462, entitled "Sanitary Napkin With Expandable Flaps" which issued to Salerno on July 10, 1990, U.S. Patent 4,917,697 entitled "Sanitary Napkin Having Flaps and Stress Relief Means" which issued to Osborn, III, et al. on April 17, 1990, U.S. Patent 4,911,701, entitled "Sanitary Napkin Having Elastic Shaping Means" which issued to Mavinkurve on March 27, 1990, U.S. Patent 4,900,320, entitled "Sanitary Napkin With Panty Gathering Flaps" which issued to McCoy on February 13, 1990, U.S. Patent 4,687,478, entitled "Shaped Sanitary Napkin With Flaps", which issued to Van Tilburg on August 18, 1987, U.S. Patent 4,608,047, entitled "Sanitary Napkin Attachment Means", which issued to Mattingly on August 26, 1986, U.S. Patent 4,589,876, entitled "Sanitary Napkin", which issued to Van Tilburg on May 20, 1986, U.S. Patent 4,285,343, entitled "Sanitary Napkin", which issued to McNair on August 25, 1981, U.S. Patent 3,397,697, entitled "Disposable Sanitary Shield For Undergarments", which issued to Rickard on August 20, 1968, and U.S. Patent 2,787,241, entitled "Sanitary Napkin", which issued to Clark on April 2, 1957.

[0068] Suitable absorbent articles in the form of pantliners are disclosed in U.S. Patent 4,738,676 entitled "Pantliner" issued to Osborn on April 19, 1988. Suitable absorbent articles, at least some of which are in the form of adult incontinence products, are described in U.S. Patent Application Serial Number 07/637,571 entitled "Absorbent Article Having Rapid Acquiring Wrapped Multiple Layer Absorbent Body" filed by Barry R. Feist, et al. on January 3, 1991.

[0069] The characteristics of the flaps 24 will now be looked at in greater detail. The general construction of flaps 24 suitable for use in the present invention (without the zones of differential extensibility) is described in greater detail in the patents incorporated by reference herein.

[0070] The overall size of the flaps 24 can be readily selected by those skilled in the art. Preferably, the flaps 24 are sized so that the sanitary napkin 20 is from about 10 to about 23 centimeters wide between the distal edges 34 of the flaps at their greatest separation. Preferably each flap 24 is from about 5 to at least about 19 centimeters long in the direction parallel to the principal longitudinal centerline 1 of the sanitary napkin.

[0071] The shape of the flaps 24 can be selected by

those skilled in the art. Preferably, not only are the flaps 24 mirror images of each other, the two halves of each flap 26 and 28 are also symmetrical about the flap transverse centerline  $t_1$ . (It should be understood that the shape and orientation of the flaps described herein are those of a preferred embodiment. They are not mandatory design features.)

[0072] In the embodiment illustrated in Figure 1, the flaps 24 are positioned slightly forward of the principal transverse centerline  $t$  of the sanitary napkin. (In such a case, the flap transverse centerline  $t_1$  does not coincide with the principal transverse centerline  $t$  of the sanitary napkin 20.) The flaps 24, however, are preferably evenly spaced from the principal longitudinal centerline 1 of the sanitary napkin.

[0073] The flaps 24 can be associated with the main body portion 22 in a number of different manners. Many of the different ways a component (such as the flaps 24) can be "joined to" or "associated with", etc. another component which are set forth in the definitions of these terms contained in U.S. Patent 5,007,906 entitled "Decoupled Sanitary Napkin" which issued to Osborn, et al. on April 16, 1991. When the flaps comprise separate elements, they can be joined to the main body portion 22 by any techniques known to those skilled in the art. Such techniques include, but are not limited to adhesives, heat and/or pressure, ultrasonics, etc.

[0074] The flaps 24 are associated with the main body portion 22 along lines of juncture 30. The lines of juncture can be concave, straight, (or, but preferably not convex) relative to the principal longitudinal centerline 1. The lines of juncture 30 may comprise those lines or areas where separate flap elements are joined to the main body portion 24. Alternatively, when the flaps 24 are integral with the main body portion 22, the lines of juncture 30 may represent lines of demarcation between the main body portion 22 and the flaps 24 (although it is not necessary that there be a precise line of demarcation).

[0075] It is also not necessary that the flaps 24 extend from (or be joined along) the longitudinal edges 22a of the main body portion 22. The flaps 24 can be joined inward (or "inboard") from the longitudinal edges 22a toward the longitudinal centerline such as is shown in U.S. Patent 4,900,320 issued to McCoy on February 13, 1990. The flaps 24 can, thus, each be joined to the main body portion 22 along the principal longitudinal centerline 1, or along the longitudinal edges 22a of the main body portion 22, or at any place between the principal longitudinal centerline 1 and the longitudinal edges 22a of the main body portion 22. The flaps 24 will, of course, generally be on opposite sides of the principal longitudinal centerline 1.

[0076] Having now described some sanitary napkins that can be used in conjunction with the present invention (as well as the characteristics of their flaps), the sanitary napkin of the present invention will now be described in greater detail with relation to the function of the same in the wearer's undergarments.



[0077] Figure 3 is a depiction of the crotch portion 14 of an undergarment 11 of the type commonly worn by many women and well known as a panty. A panty 11 comprises a front section 10, a back section 12, and a crotch portion 14 which joins the front and back sections. The crotch portion 14 comprises two side edges 16 and center crotch portion 18.

[0078] The sanitary napkin 20 of the present invention is utilized by removing the release liners 58 and placing the sanitary napkin 20 in a panty 11. The center of main body portion 22 is placed in crotch portion 14 of the panty with one end of main body portion 22 extending towards the front section 10 of the panty and the other end towards the back section 12. The backsheet 42 is placed in contact with the inner surface of center crotch portion 18 of the panty. Central pad adhesive 54 maintains main body portion 22 in position. The distal portions of flaps 24 are folded around the side edges 16 of the panty. The flap adhesives secure the flaps 24 to the underside of the panty.

[0079] When the flaps 24 are folded down around the edge 16 of the crotch portion 14 of the panty, stresses are developed in the flaps, particularly in the corner regions 52' of the same. These stresses are magnified when the flaps 24 are folded under the panty and attached to the panty's underside. The stresses are further magnified when the panty is pulled up into position and the elastics in the panty edges 16 force the folded portion of the flaps into the uppermost part of the wearer's crotch and thigh.

[0080] The stresses are most highly concentrated along the fold where the flap 24 changes from being disposed on the bodyside of the panty to being located on the underside of the panty. In other words, the stresses are concentrated at the edge 16 of the crotch portion 14 of the panty 11. The stresses in the flaps 24 generally follow the arc formed by the edges 16 of the crotch portion 14. These stresses may cause the corner regions 52' of the flaps 24 to bunch longitudinally inward. This reduces the area of the wearer's undergarments the flaps are able to cover. If the stresses are great enough, the flaps 24 can become detached from the panty and the flaps 24 will be less than optimally effective. Depending on the design of the sanitary napkin, the arc of concentrated stresses may or may not coincide with the lines of juncture 30 between the flaps 24 and the main body portion 22.

[0081] In order to eliminate, or at least reduce these stresses, the sanitary napkin 20 is provided with zones of differential extensibility 50. The zones of differential extensibility 50 preferably reduce the stresses along the fold to such a degree that the flaps 24 will remain attached to the underside of the panty and will not lose their ability to cover a given area of the wearer's undergarments.

[0082] The characteristics of the zones of differential extensibility 50 are described in greater detail below. That is followed by a discussion of some alternatively

preferred types of zones of differential extensibility.

[0083] The zones of differential extensibility 50 are, as noted above, most preferably located at those points where the edges 35 of the flaps 24 intersect the edges 16 of the panty when the sanitary napkin 20 is worn.

[0084] The points of intersection can generally be determined by having a person wear a particularly designed napkin having flaps and a fairly commonly designed panty. Commonly, panties have a crotch width of about 5.0 to about 9.0 centimeters. Marks can then be made on the bottom surface of the sanitary napkin 20 where the sanitary napkin 20 intersects the panty. The points of intersection between the flap 24 and the edge 16 of the panty generally coincide with the ends of the fold 19. Assuming the napkin has two flaps, the four marks will mark the general locations for the zones of differential extensibility 50. The zones of differential extensibility 50 may be located along the lines of juncture 30, outboard of the lines of juncture in the flaps 24, or inboard of the lines of juncture. Commonly, the zones of differential extensibility 50 will begin at a point located between the area of the flap transverse centerline  $t_1$  and about 1.5 centimeters in the longitudinal direction from the flap transverse centerline  $t_1$ .

[0085] The zones of differential extensibility 50 may be of any shape. Typically, they will form a three-sided figure (roughly triangular, pie-shaped, or fan-shaped) in plan view when they are fully extended. Often, the figure defined by the zones of differential extensibility will have two sides that are of approximately equal length and a shorter side. The edge 35 of the flaps 24 usually forms the shorter side. It should be understood, however, that the precise shape of the zones of differential extensibility 50 is not always as critical as the location and extensibility properties of the same. Likewise, it is not critical for there to be precise line of demarcation that marks the boundaries of the zones of differential extensibility 50 (or the boundaries of the complementary first portions of the quarters of the sanitary napkin). Thus, there can be a gradual transition between the zones of differential extensibility 50 and the first portions of the quarters of the sanitary napkin.

[0086] The zones of differential extensibility 50 may be bounded on one side by the line of juncture 30. Alternatively, the boundary may be adjacent the line of juncture 30. If the zones of differential extensibility 50 are provided in the main body portion 22 (for instance, if they are formed by a fold made through the main body portion 22 (as described below)), however, this boundary may be as far inboard as the principal longitudinal centerline 1. The zones of differential extensibility 50 are typically bounded at the ends by at least a portion of the edge 35 of the flap 24. This is often a curved line. (The zones of differential extensibility 50 can also be bounded at the ends by a portion of the longitudinal edges 22a of the main body portion and/or transverse or end edges 22b of the main body portion 22.) The third side of the zones of differential extensibility is typically formed by a

boundary 51 which may be an imaginary line that runs from the point of the zone of differential extensibility 50 which is either located on the flap transverse centerline  $t_1$  (or nearest to the same), to a point on the edge 35 of the flap 24.

[0087] The total area covered by the zones of differential extensibility 50 can vary widely. The area can cover a relatively large portion of the sanitary napkin, provided there remain some portions of the sanitary napkin adjacent at least portions of the principal longitudinal centerline and the flap transverse centerline that are less extensible. The zones of differential extensibility 50 can be provided along the entire juncture 30 of the flaps 24 with the main body portion 22. In alternative embodiments, the zones of differential extensibility 50 can be provided throughout the entire flap (for instance, if the entire flap is pleated with longitudinally-oriented pleats). Preferably, however, in the present invention, zones of differential extensibility 50 are not provided either along the entire juncture 30 or throughout the entire flap. There are several reasons for this.

[0088] First, due to the curvature of the panty crotch, all portions of the flaps are not stressed the same amount when the flaps are wrapped around a panty crotch. Typically, the portion of the flaps located adjacent the flap transverse centerline  $t_1$  (the center portion 27 of the flap) will not be subjected to stresses that are as great as those exerted on the flap corner regions 52'. Thus, it is possible that the center portion 27 of the flaps (and possibly also the adjacent regions of the main body portion 22) could be constructed so that it is not provided with any extensibility properties. Alternatively, the center portion 27 (and adjacent regions) could merely be less extensible than the corner regions 52 of the sanitary napkin.

[0089] Second, it is preferable that the corner regions 52' of the flaps 24 stretch a greater distance in the transverse direction than the center portion 27 of the flaps for the best fit and for the flaps 24 to adapt properly to the curvature of the crotch of the wearer's undergarments. This allows the boundary 51 defined by the zones of differential extensibility to correspond to the configuration of the edges of the crotch of the wearer's panties.

[0090] Third, depending on the process used to create the zones of differential extensibility 50, it may be less expensive to provide differential extensibility in only certain portions of the sanitary napkins.

[0091] The amount of differential extensibility needed can vary depending on a number of factors. These include, but are not limited to the size and configuration of the wearer's panties, the size and configuration of the flaps, etc. Any amount of differential extensibility in the corner regions 52 will provide some benefit versus a sanitary napkin that is not provided with zones of differential extensibility. The amount of differential extensibility should not be so great, however, that the excess material that comprises the zones of differential extensibility 50 causes the sanitary napkin to fit sloppily adjacent

the wearer's panties and her body.

[0092] Preferably, the amount of differential extensibility is sufficient to substantially reduce the stresses on the flaps when the sanitary napkin is worn. Typically, a conservatively configured zone of differential extensibility 50 is one which when fully extended, defines a linear boundary 51 (i.e., one which forms a straight line) that runs from the intersection of the flap transverse centerline  $t_1$  and the line of juncture 30 to the point on the edge 35 of the flap 24 where the flap 24 intersects the edge 16 of the panty crotch. A zone of differential extensibility 50 with a linear configuration is said to be conservatively configured because it will ordinarily provide a sufficient amount of extensibility in most cases to relieve the stresses in the flaps 24. In an ideal case, the boundary 51 will correspond to the configuration of the edges 16 of the crotch of the wearer's panties.

[0093] Figures 2 and 2A show a sanitary napkin having a zone of differential extensibility. The sanitary napkin 20 shown in Figures 2 and 2A has flaps with corner regions 52 that have been provided with differential extensibility by ring rolling these corner regions in accordance with the above-described ring rolling patents and patent applications. The ring rolling (or pre-corrugating) should be applied so that the fold lines 60 in the corrugations are oriented generally in the longitudinal direction. The phrase "generally in the longitudinal direction" (and similar phrases), as used herein, means oriented more in the longitudinal dimension than in the transverse dimension. Thus, the fold lines 60 may angle away from the principal longitudinal centerline 1. This will also provide the desired transverse direction extensibility.

[0094] In variations of the embodiments of the present invention (such as the embodiment shown in Figure 2 and 2A), the amount of extensibility provided can be varied throughout different portions of the zones of differential extensibility 50. For instance, the number or amplitude of the corrugations formed by the ring rolling could be varied so that either or both these characteristics are greater further from the flap transverse centerline  $t_1$ . This will allow the sanitary napkin to be provided with differential extensibility characteristics that most closely match the configuration of a panty crotch.

[0095] Figure 5 shows an embodiment in which the sanitary napkin 20 is provided with a barrier 98 along the proximal edges 32 of the flaps 24. The barrier 98 stands up to serve as a wall to retain exudates flowing in the transverse direction toward the flaps 24 (shown in the flap 24 located near the top of the sheet containing Figure 5). The barrier 98 may stand up before (and after) the sanitary napkin is placed in the wearer's undergarments, or it may initially lie relatively flat against the top-sheet and use the forces exerted by folding of the flaps down under the wearer's undergarments to stand up. In other alternative embodiments, the barrier 98 may have its ends tacked down near the ends of the junctures so that it slants inwardly during use rather than standing straight up.

[0096] The barrier 98 may be provided on the embodiments described herein. (The barrier may also be provided on other sanitary napkin embodiments. For instance, the flaps of the sanitary napkin 20 shown are completely extensible. In addition, the sanitary napkin could even be provided with such a barrier 98 if it did not have flaps 24.) The barrier 98 may be constructed in any suitable manner. Figure 5 shows one preferred construction in which the barrier 98 is formed by providing flaps 24 that comprise non-integral (or separate) elements. The barrier 98 is formed by providing these flap elements with an extension of excess material inboard of the junctures 30. The barrier 98 may be made of the same material as the remainder of the flaps 24. Alternatively, it may (and/or the portions of the flaps adjacent the barrier) may be made of a stiffer material to aid the barrier in standing up.

[0097] In still other alternative embodiments, the sanitary napkin could be provided with additional components. For instance, the sanitary napkin could be provided with the wet-laid tissue and/or the liquid permeable wipe acquisition sheet described in greater detail in U.S. Patent 5,009,653 issued to Osborn. In addition, such sanitary napkins could be provided with additional types of stress relief means such as those described in U.S. Patent 4,917,697 at various locations around the periphery of the sanitary napkin.

[0098] Thus, the present invention provides a sanitary napkin having flaps and zones of differential extensibility to provide an improved stress relief means for relieving the stresses that develop in the flaps when the flaps are folded down and under a wearer's undergarment.

## Claims

1. An absorbent article (20) for wearing in an undergarment (11), said absorbent article (20) having a principle longitudinal centerline (L) and a transverse centerline (T), said absorbent article (20) comprising:

a main body portion (22) having two spaced apart longitudinal side edges (22a) and two spaced apart transverse end edges (22b), said main body portion comprising a liquid pervious top sheet (40), a liquid impervious backsheet (42) joined to said topsheet (40) and an absorbent core (44) positioned between said topsheet (40) and said backsheet (42);

a pair of flaps (24) for folding around and securing said absorbent article (20) to said undergarment (11), said flaps (24) being associated with said main body portion (22) at a juncture (30), with one flap (24) extending laterally outward from each longitudinal side edge (22a) of said main body portion (22), said flaps (24) hav-

ing a flap transverse centerline ( $T_1$ ) that intersects the principal longitudinal centerline (L) of the absorbent article (20), said absorbent article (20) comprising a stress relief means in said flaps (24),

said absorbent article (20) being characterized in that at least a portion of one of said flaps (24) comprises a zone (50) of differential extensibility which provides said stress relief means,

said zone (50) of differential extensibility is capable of greater extension outward in a generally transverse direction than other portions of said absorbent article (20)

said zone (50) of differential extensibility is made of pre-corrugated or ring rolled portions of said absorbent article (20).

2. The absorbent article (20) of Claim 1 wherein said flap transverse centerline ( $T_1$ ) intersects the principal longitudinal centerline (L) of said absorbent article (20) to divide the absorbent article (20) into four quarters, each quarter comprising a first portion adjacent said principal longitudinal centerline and said flap transverse centerline, and a second portion outboard of said first portion, wherein said second portion of at least one of said quarters comprises said zone (50) of differential extensibility.
3. The absorbent article (20) of Claim 1 wherein each of said flaps (24) is divided into a front half and a back half by said flap transverse centerline, ( $T_1$ ) and said absorbent article (20) has two corner regions adjacent each flap (24), said corner regions being located adjacent the juncture (30) of each flap (24) with said main body portion (22), wherein the first corner region is adjacent the front half of said flaps (24) and the second corner region is adjacent the back half of said flaps (24), and said corner regions are spaced longitudinally away from said flap transverse centerline ( $T_1$ ), and said zone (50) of differential extensibility is located in at least one of said corner regions.
4. The absorbent article (20) of Claim 2 wherein said pre-corrugated or ring rolled portions of said absorbent article (20) have generally longitudinally-oriented fold lines;
5. The absorbent article (20) of Claim 1 having a barrier along the proximal edges of said flaps (24).

## Patentansprüche

1. Absorbierender Artikel (20) zum Tragen in einer Un-

terwäsche (11), wobei der absorbierende Artikel (20) eine in Längsrichtung verlaufende Basis-Zentrallinie (L) und eine in Querrichtung verlaufende Zentrallinie (T) aufweist, welcher absorbierende Artikel (20) umfaßt:

einen Hauptkörperabschnitt (22), der zwei voneinander auf Abstand liegende, in Längsrichtung verlaufende Seitenkanten (22a) und zwei in Abstand voneinander liegende, in Querrichtung verlaufende Endkanten (22b) aufweist, wobei der Hauptkörperabschnitt eine flüssigkeitsdurchlässige Decklage (40), eine flüssigkeitsundurchlässige Außenlage (42), die mit der Decklage (40) verbunden ist, und einen absorbierenden Keim (44) aufweist, der zwischen der Decklage (40) und der Außenlage (42) angeordnet ist;

ein Paar von Klappen (24) zum Herumfalten und Befestigen des absorbierenden Artikels (20) an der Unterwäsche (10), wobei die Klappen (24) dem Hauptkörperabschnitt (22) an einer Verbindungsstelle (30) zugeordnet sind, wobei eine Klappe (24) sich seitlich nach außen von jeder in Längsrichtung verlaufenden Seitenkante (22a) des Hauptkörperabschnittes (22) erstreckt, wobei die Klappen (24) eine in Querrichtung verlaufende Klappen-Zentrallinie (T<sub>1</sub>) aufweisen, die die grundsätzliche, in Längsrichtung verlaufende Basis-Zentrallinie (L) des absorbierenden Artikels (20) schneidet, wobei der absorbierende Artikel (20) in den Klappen (24) eine Entspannungseinrichtung aufweist,

wobei der absorbierende Artikel (20) dadurch gekennzeichnet ist, daß zumindest ein Abschnitt von einer der Klappen (24) eine Zone (50) mit einer unterschiedlichen Dehnbarkeit umfaßt, die die Entlastungseinrichtung schafft,

wobei die Zone (50) von unterschiedlicher Dehnbarkeit in der Lage ist, sich nach außen in einer im wesentlichen transversalen Richtung stärker auszudehnen, als andere Abschnitte des absorbierenden Artikels (20),

wobei die Zone (50) von unterschiedlicher Dehnbarkeit aus vorgewellten oder geringelten Abschnitten des absorbierenden Abschnittes (20) erzeugt ist.

2. Absorbierender Artikel (20) nach Anspruch 1, wobei die in Querrichtung verlaufende Klappen-Zentrallinie (T<sub>1</sub>) die in Längsrichtung verlaufende Basis-Zentrallinie (L) des absorbierenden Artikels (20) schneidet, um den absorbierenden Artikel (20) in

vier Viertel zu teilen, wobei jedes Viertel einen ersten Abschnitt bei der in Längsrichtung verlaufenden Basis-Zentrallinie und der in Querrichtung verlaufenden Klappen-Zentrallinie und einen zweiten Abschnitt außerhalb des ersten Abschnittes aufweist, wobei der zweite Abschnitt von zumindest einem der Viertel die Zone (50) von unterschiedlicher Dehnbarkeit umfaßt.

3. Absorbierender Artikel (20) nach Anspruch 1, wobei jede der Klappen (24) in eine vordere Hälfte und eine hintere Hälfte durch die in Querrichtung verlaufende Klappen-Zentrallinie (T<sub>1</sub>) geteilt ist, und wobei der absorbierende Artikel (20) zwei Eckregionen bei jeder Klappe (24) aufweist, welche Eckregionen bei der Verbindungsstelle (30) jeder Klappe (24) mit dem Hauptkörperabschnitt (22) angeordnet sind, wobei die erste Eckregion bei der Vorderhälfte der Klappen (24) und die zweite Eckregion bei der hinteren Hälfte der Klappen (24) angeordnet sind, und wobei die Eckregionen mit Abstand in Längsrichtung weg von der in Querrichtung verlaufenden Klappen-Zentrallinie (T<sub>1</sub>) liegen, und wobei die Zone (50) von unterschiedlicher Dehnbarkeit in zumindest einer der Eckregionen angeordnet ist.

4. Absorbierender Artikel (20) nach Anspruch 2, wobei die vorgewellten oder geringelten Abschnitte des absorbierenden Abschnittes (20) im wesentlichen in Längsrichtung orientierte Faltlinien aufweisen.

5. Absorbierender Artikel (20) nach Anspruch 1 mit einer Barriere entlang der proximalen Kanten der Klappen (24).

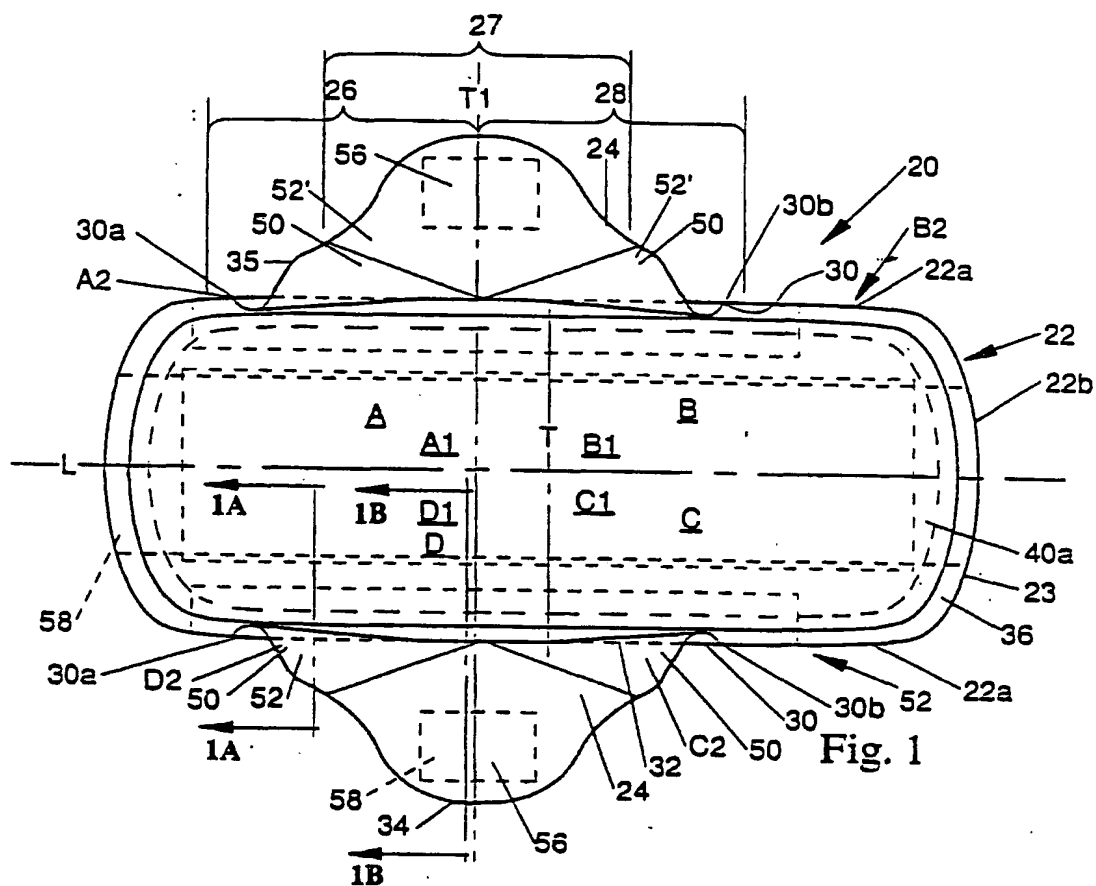
## Revendications

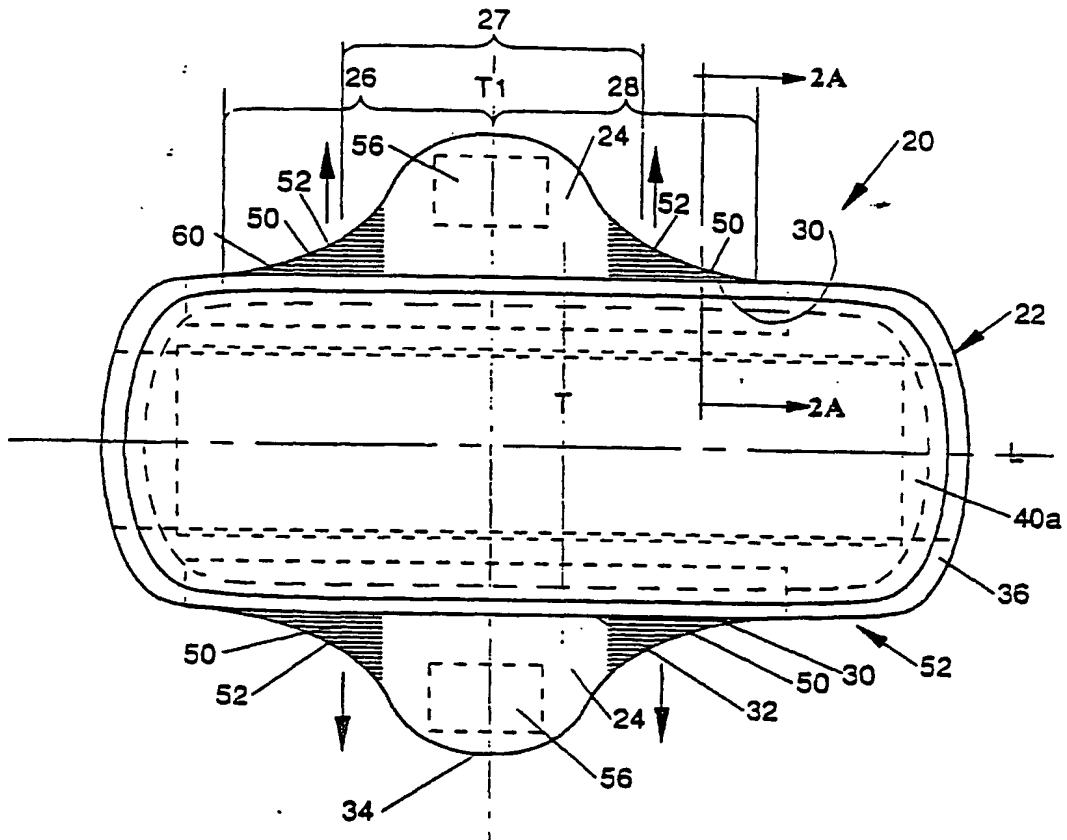
1. Article absorbant (20) destiné à être porté dans un sous-vêtement (11), ledit article absorbant (20) présentant une ligne médiane longitudinale principale (L) et une ligne médiane transversale (T), ledit article absorbant (20) comprenant :

une partie de corps principal (22) comportant deux bords latéraux longitudinaux espacés (22a) et deux bords d'extrémité transversaux espacés (22b), ladite partie de corps principal comprenant une feuille de dessus (40) perméable aux liquides, une feuille de fond (42) imperméable aux liquides réunie à ladite feuille de dessus (40) et une âme absorbante (44) placée entre ladite feuille de dessus (40) et ladite feuille de fond (42) ;

une paire de rabats (24) destinés à être pliés autour dudit article absorbant (20) et à l'assujettir audit sous-vêtement (11), lesdits rabats (24) étant associés à ladite partie de corps prin-

- cipal (22) au niveau d'une jonction (30), un rabat (24) s'étendant latéralement vers l'extérieur depuis chaque bord latéral longitudinal (22a) de ladite partie de corps principal (22), lesdits rabats (24) présentant une ligne médiane transversale de rabat ( $T_1$ ) qui croise la ligne médiane longitudinale principale (L) de l'article absorbant (20). ledit article absorbant (20) comprenant un moyen de relâchement de contrainte dans lesdits rabats (24),  
 ledit article absorbant (20) étant caractérisé en ce qu'au moins une partie d'un desdits rabats (24) comprend une zone (50) d'extensibilité différentielle qui fournit ledit moyen de relâchement de contrainte,  
 ladite zone (50) d'extensibilité différentielle est capable d'une extension vers l'extérieur dans une direction globalement transversale, supérieure à celle des autres parties dudit article absorbant (20),  
 ladite zone (50) d'extensibilité différentielle est faite de parties pré-ondulées ou roulées en anneau dudit article absorbant (20).
2. Article absorbant (20) selon la revendication 1, dans lequel ladite ligne médiane transversale de rabat ( $T_1$ ) croise la ligne médiane longitudinale principale (L) dudit article absorbant (20) afin de diviser l'article absorbant (20) en quatre quartiers, chaque quartier comprenant une première partie adjacente à ladite ligne médiane longitudinale principale et à ladite ligne médiane transversale de rabat, et une deuxième partie extérieure à ladite première partie, dans lequel ladite deuxième partie d'au moins un desdits quartiers comprend ladite zone (50) d'extensibilité différentielle.
3. Article absorbant (20) selon la revendication 1, dans lequel chacun desdits rabats (24) est divisé en une moitié avant et une moitié arrière par ladite ligne médiane transversale de rabat ( $T_1$ ), et ledit article absorbant (20) comporte deux régions d'angle adjacentes à chaque rabat (24), lesdites régions d'angle étant situées à proximité immédiate de la jonction (30) de chaque rabat (24) avec ladite partie de corps principal (22), dans lequel la première région d'angle est adjacente à la moitié avant desdits rabats (24), et la deuxième région d'angle est adjacente à la moitié arrière desdits rabats (24), et lesdites régions d'angle sont espacées longitudinalement à distance de ladite ligne médiane transversale de rabat ( $T_1$ ), et ladite zone (50) d'extensibilité différentielle est située au moins dans une desdites régions d'angle.
4. Article absorbant (20) selon la revendication 2, dans lequel lesdites parties pré-ondulées ou roulées en anneau dudit article absorbant (20) présentent des lignes de pliage orientées globalement longitudinalement.
5. Article absorbant (20) selon la revendication 1, présentant une barrière le long des bords proximaux desdits rabats (24).





**Fig. 2**

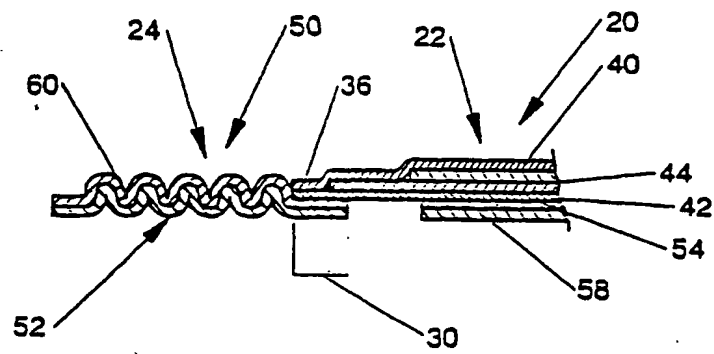


Fig. 2A

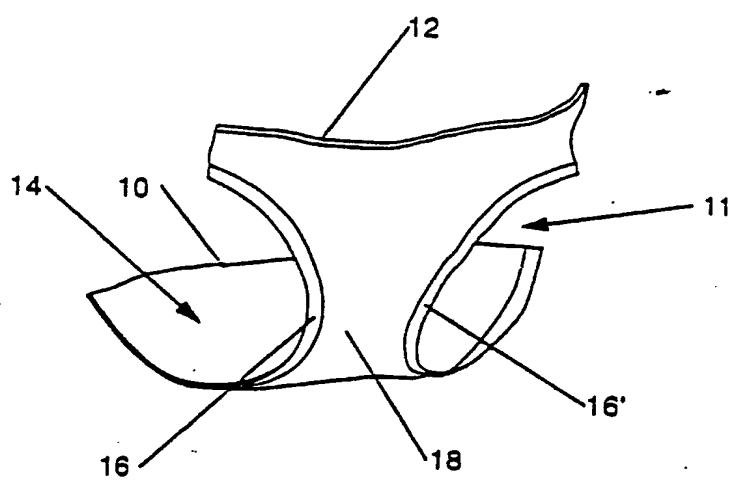
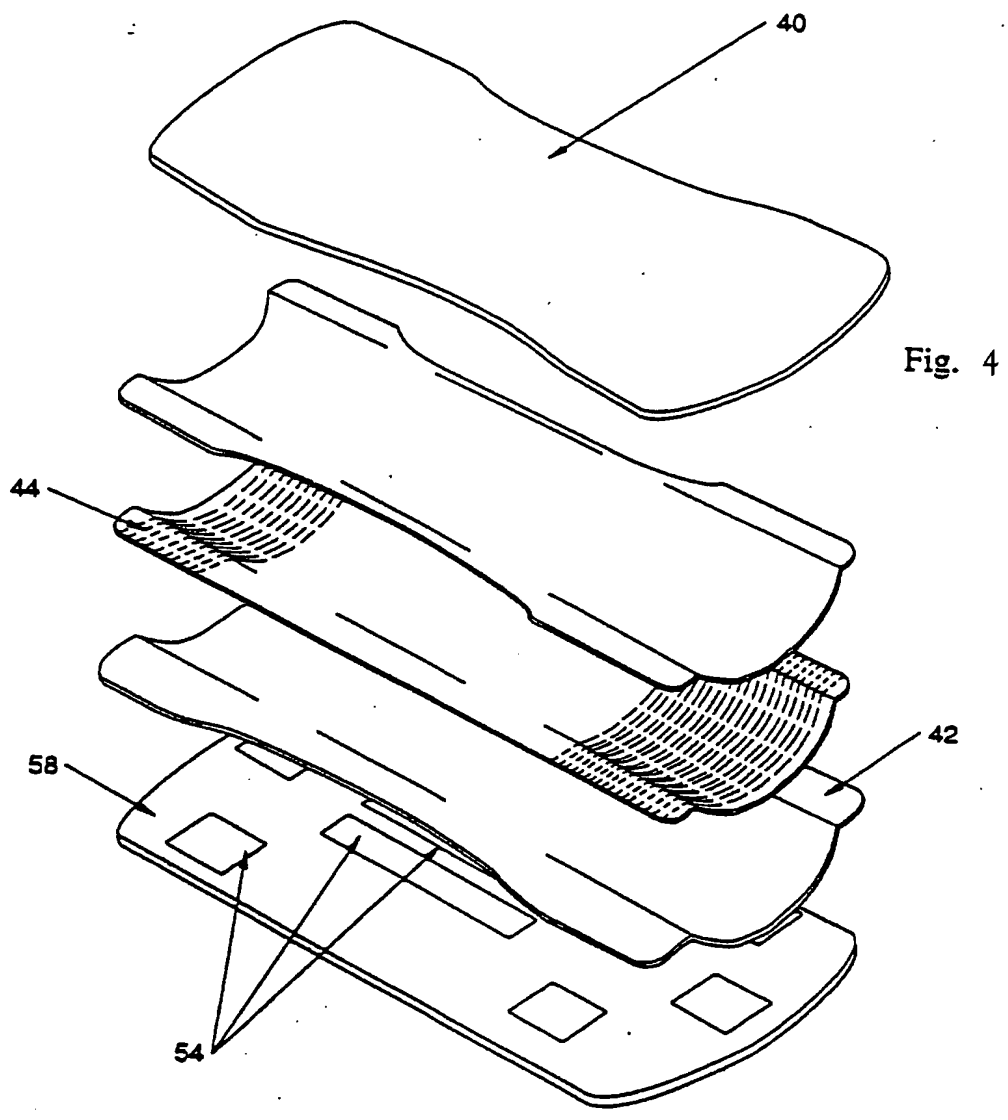


Fig. 3





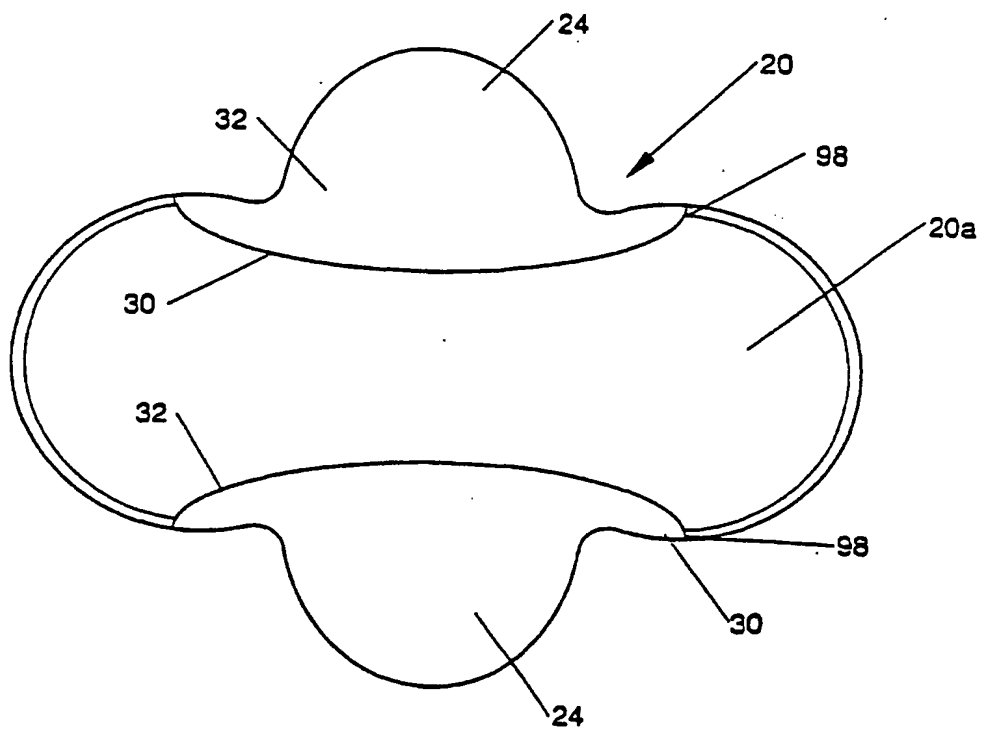


Fig. 5